

# K.E. & P.E.

## Rule for Kinetic Energy

$$\text{KE} = \frac{1}{2} \text{Mass} \times \text{Velocity}^2$$

(Joules)      (kg)      (m/s)

$$\text{KE} = \frac{1}{2} m \times v^2$$

## Rule for Gravitational Potential Energy

$$\text{GPE} = \text{Mass} \times \text{Gravitational Acceleration} \times \text{Height}$$

(Joules) (kg)      (9.81 m/s<sup>2</sup>)      (m)

$$\text{GPE} = m \times g \times h$$

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## Questions

1. What is the kinetic energy of a ball with a mass of 5 kg rolling at 10 m/s?
2. What kinetic energy has a 100kg car travelling at 15 m/s?
3. How much kinetic energy has a 5 kg bullet speeding at 100 m/s?
4. What kinetic energy has a 4 kg shot put thrown with a velocity of 13 m/s?
5. If a ball has kinetic energy of 1000 Joules and a speed of 5m/s, what is its mass?
6. What is the gravitational potential energy of a 3 kg ball kicked into the air at a height of 5 meters?
7. How much gravitational potential energy has a boy whose mass is 50 kg and who is standing on top of a 1.5 meter high wall?
8. What is the gravitational potential energy of a 250 kg rock on top of a 200 meter cliff?
9. If an airplane with a mass of 500 kg has gravitational potential energy of 1000 joules, what is its height?
10. Describe the changes of energy forms of an arrow from the time just before its release from the bow until its landing on the ground.

## Answers

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|-----------|-----------|------------|
| 1. 250J   | 4. 338J   | 7. 735.8J  |
| 2. 11250J | 5. 80 kg  | 8. 490500J |
| 3. 25000J | 6. 147.2J | 9. 0.2m    |